HEATING AND VENTILATION 34

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GENERAL DESCRIPTION

The heater housing, containing blower and heater radiator, is located inside the vehicle under the instrument panel. Hoses connect the heater to the face-level aeroflow vents and demister nozzles.

The Transit is fitted with a two-speed blower which is operated by a rocker switch on the instrument panel.

Air leaving the heater assembly may be adjusted for temperature and air flow direction by sliding control levers in the instrument panel, which in turn actuate flap valves in the heater housing, Fig. 1.

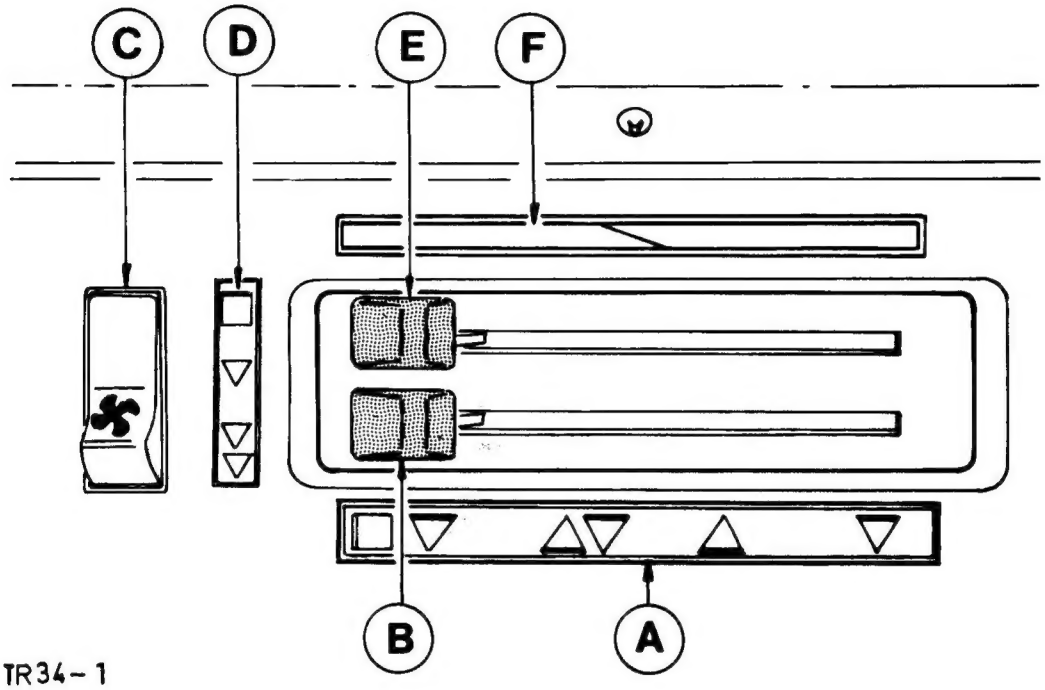

Fig. 1.
A – Symbols—air distribution
B – Air distribution lever
C – Blower switch
D – Symbols—blower operation
E – Temperature control lever
F – Symbols—temperature control

PRINCIPLE OF OPERATION

The air required for heating passes through the heater radiator which is mounted in the heater housing. The heater radiator is similar in construction to the main engine radiator and is supplied with hot coolant from the engine cooling system. Heat contained in the coolant is conducted through the radiator core, via the fins, to the air stream which warms the vehicle interior. The temperature and distribution of the air is regulated by flap valves in the heater housing.

Operating the temperature control lever (upper lever), Fig. 2, actuates the temperature regulating flap valve by means of a bowden cable to control the mixing of ambient, cold air with the warm air flow from the heater radiator.

This enables the temperature to be adjusted to suit individual requirements.

The heater may be 'switched off' completely by means of a water valve fitted in the engine compartment. When the valve is closed the heater radiator is isolated from coolant circulation.

By operating the air distribution control lever (lower lever), Fig. 2, which is connected to the air distribution flap valve by a bowden cable, the air flow is directed to the footwell and/or demister nozzles, depending on the position of the lever.

The heater assembly is designed so that the aeroflow vents can only be supplied with cold air, independent of the lever positions, Fig. 5.

To ensure an adequate flow of air even when the vehicle is travelling slowly, a two-speed electrically driven blower fan is fitted in the heater housing, Fig. 3.

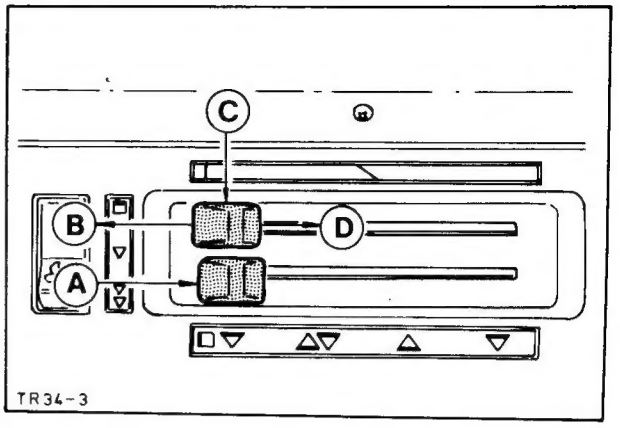

Fig. 2 A – Air distribution lever
B – Warm
C – Temperature control lever
D – Cold

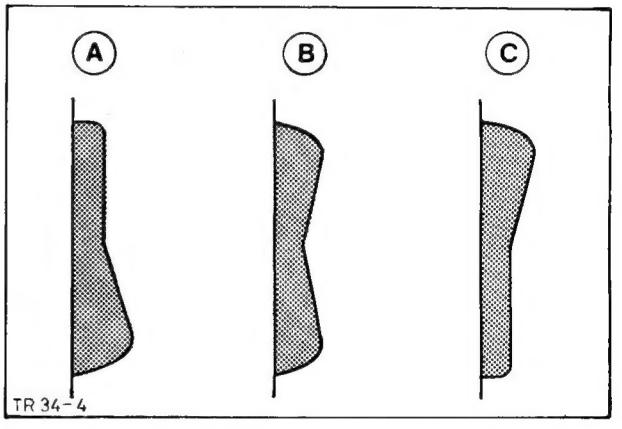

Fig. 3. A – Blower—off
B – Blower on—slow speed
C – Blower on—fast speed

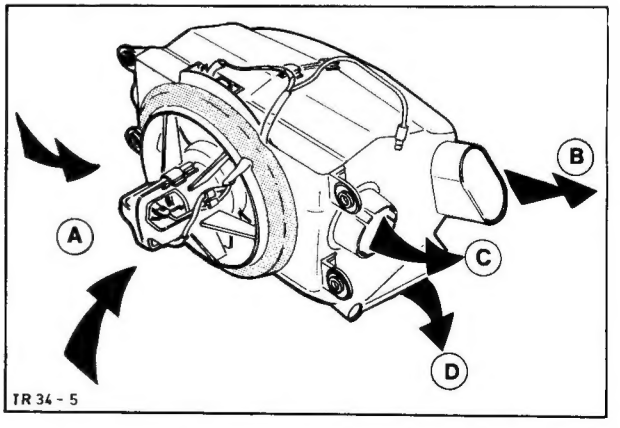

Fig. 4. A – Ambient air
B – Air flow to aeroflow vents
C – Air flow to demister nozzles
D – Footwell

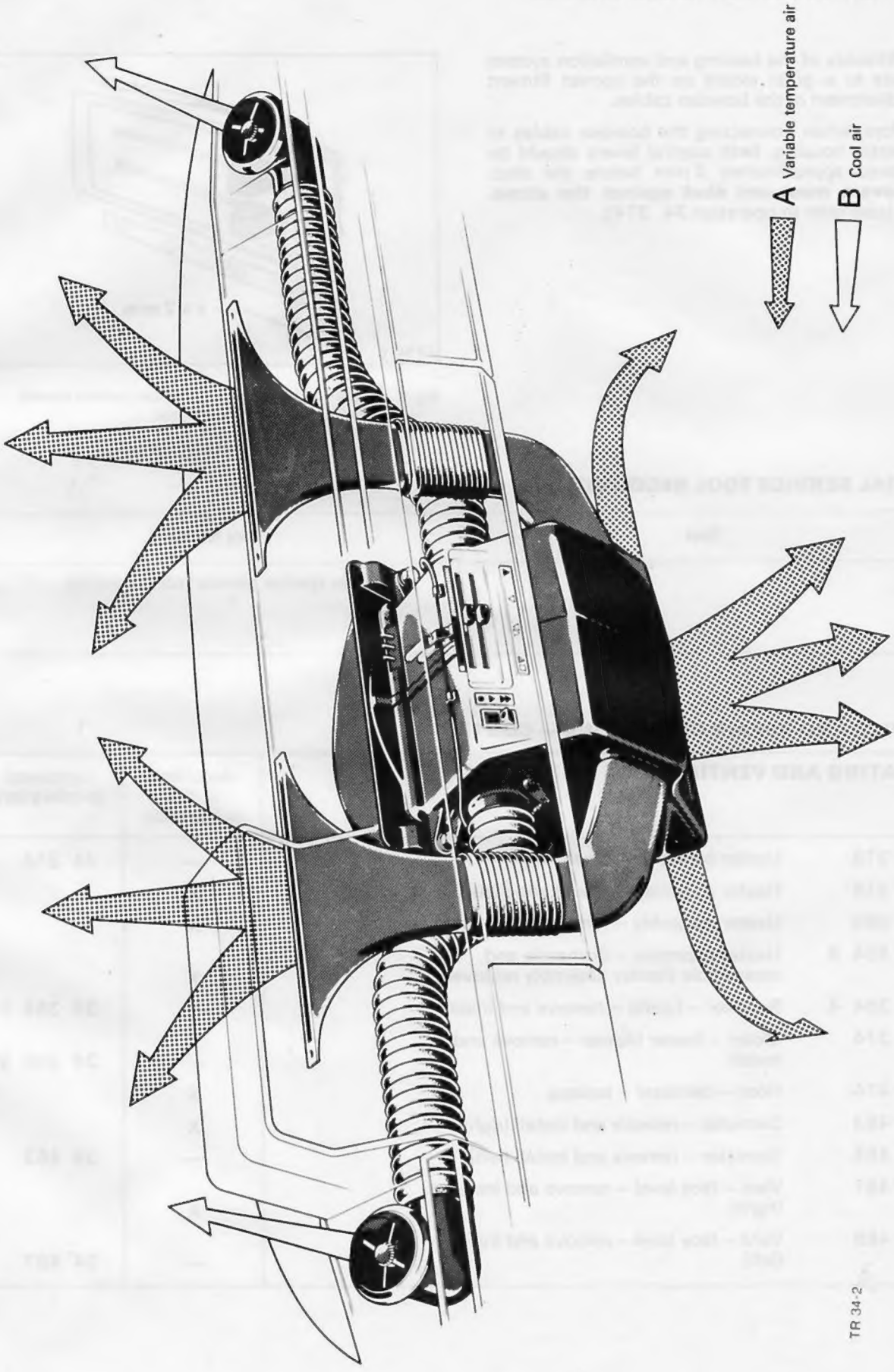

Fig. 5.

SERVICE ADJUSTMENTS AND CHECKS

The efficiency of the heating and ventilation system depends to a great extent on the correct fitment and adjustment of the bowden cables.

Therefore, when connecting the bowden cables to the heater housing, both control levers should be positioned approximately 2 mm before the stop. **The levers must not abut against the stops.** Fig. 6 (also refer to operation 34 314).

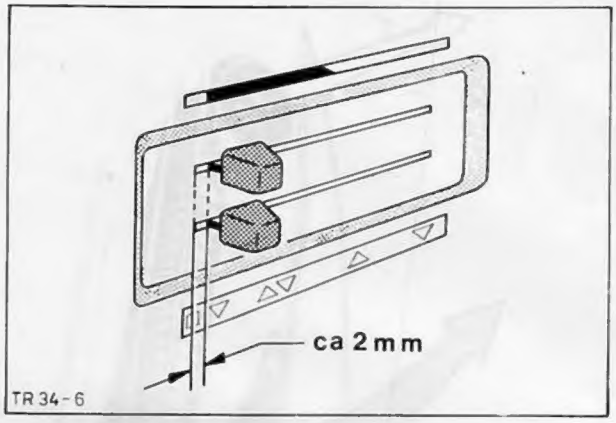

Fig. 6. Before connecting bowden cables position control levers approx 2 mm before stop

SPECIAL SERVICE TOOL RECOGNITION

Tool	Tool Name
	No special service tools required

SERVICE AND REPAIR OPERATIONS—CONTENT

HEATING AND VENTILATION		described in this publication	contained in operation
34 313	Heater controls – adjust	—	34 314
34 314	Heater controls – remove and install	X	
34 354	Heater assembly – remove and install	X	
34 354 8	Heater assembly – dismantle and reassemble (heater assembly removed)	X	
34 364 4	Radiator – heater – remove and install	—	34 354 8
34 374	Motor – heater blower – remove and install	—	34 354 8
34 474	Hose – demister – replace	X	
34 483	Demister – remove and install (right)	X	
34 484	Demister – remove and install (left)	—	34 483
34 487	Vent – face level – remove and install (right)	X	
34 488	Vent – face level – remove and install (left)	—	34 487

SERVICE AND REPAIR OPERATIONS

34 314 HEATER CONTROLS – REMOVE AND INSTALL

To Remove

1. Remove heater control panel bezel from beneath instrument panel (2 screws), Fig. 7.

   Disconnect cables from the blower switch and symbol illumination.

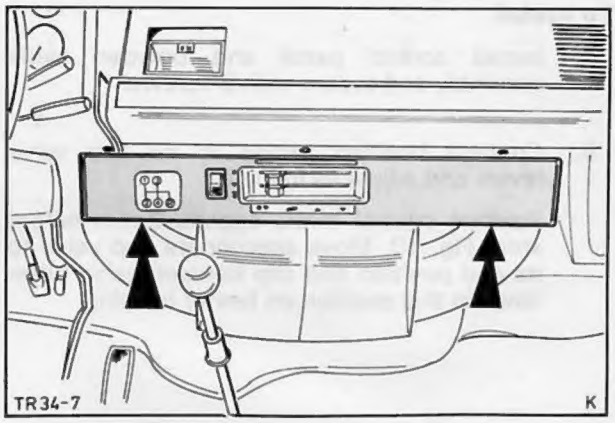

Fig. 7. Remove bezel from instrument panel

2. Detach bowden cables from heater housing (2 screws) and unhook cables from air flap valve levers, Fig. 8.

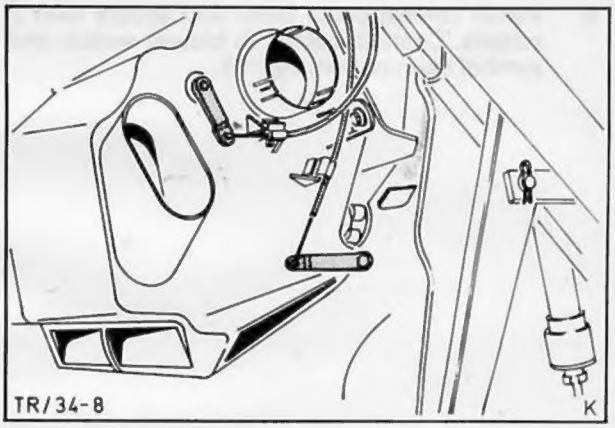

Fig. 8. Detach bowden cables from heater housing and air flap valve levers

3. Remove heater control panel (2 screws), Fig. 9, from instrument panel and withdraw complete with bowden cables.

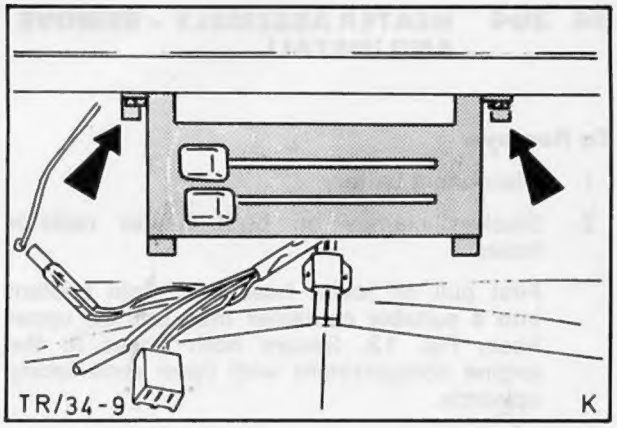

Fig. 9. Remove heater control panel

34 314 (cont'd)

To Install

4. Install control panel and bowden cable assembly and secure with 2 screws.

5. Connect bowden cables to air flap valve levers and adjust as follows:

   Position control levers approx. 2 mm before stop, Fig. 10. Move appropriate flap valve to its end position and clip bowden cable outer cover in this position on heater housing.

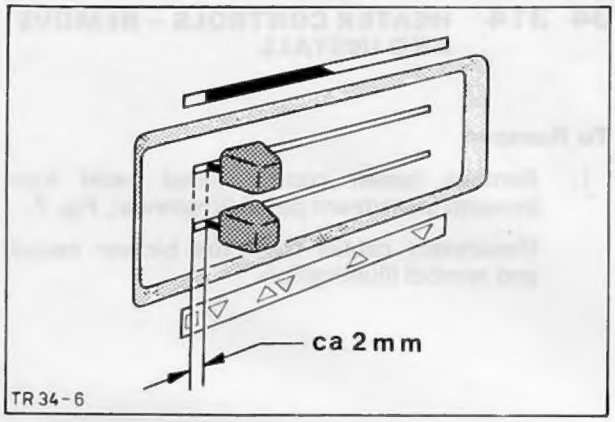

Fig. 10. Position control lever approx. 2 mm before stop

6. Install control panel bezel and secure with 2 screws. Connect cables to blower switch and symbol illumination, Fig. 11.

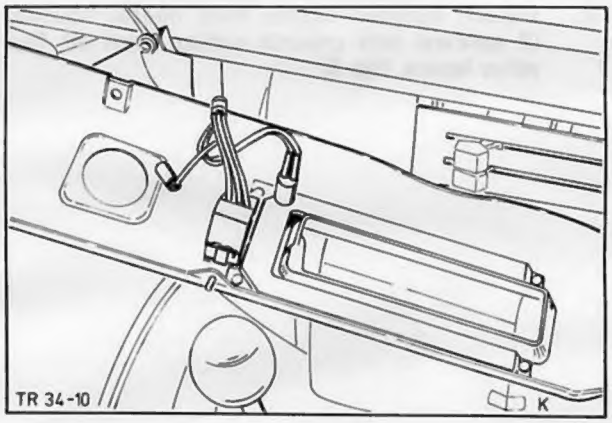

Fig. 11. Connect cables to switch and illumination

34 354 HEATER ASSEMBLY – REMOVE AND INSTALL

To Remove

1. Disconnect battery.
2. Slacken clamps on both heater radiator hoses.

   First pull off lower hose and drain coolant into a suitable container then pull off upper hose, Fig. 12. Secure both hoses in the engine compartment with open ends facing upwards.

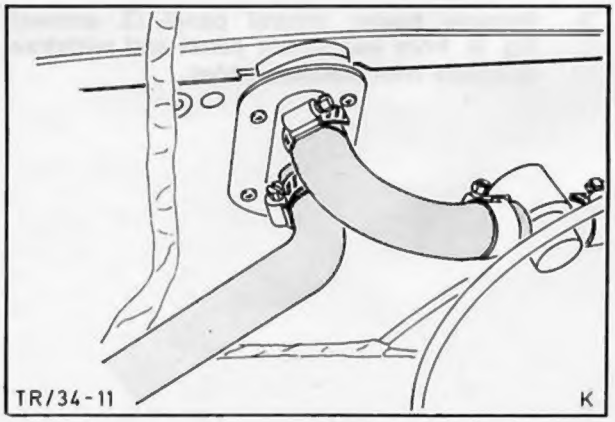

Fig. 12. Disconnect hoses from heater radiator

34 354 (cont'd)

3. Remove cover plate and gasket from bulkhead (4 screws), Fig. 13.

4. Remove heater control panel bezel from underneath the instrument panel (2 screws) and disconnect cables from the blower switch and symbol illumination.

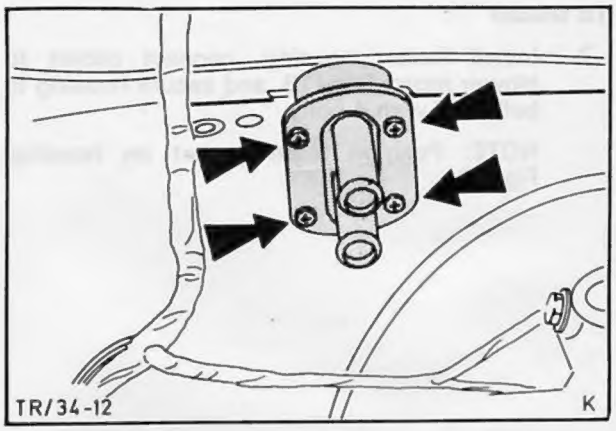

Fig. 13. Remove cover plate and gasket from bulkhead

5. Pull of air hoses (4 off) from heater housing, Fig. 14. Detach bowden cables from heater housing (2 screws) and unhook cables from air flap valve levers.

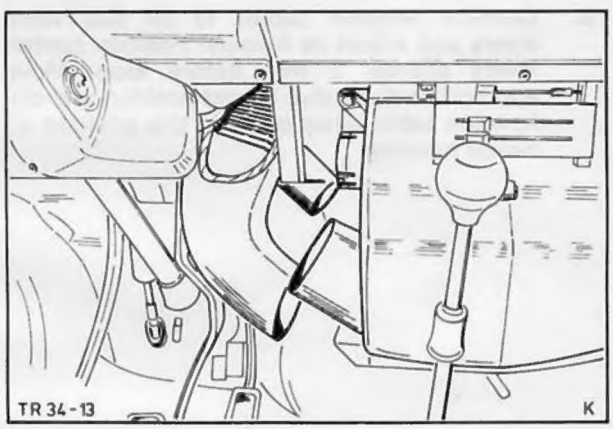

Fig. 14. Disconnect air hoses from heater housing

6. Detach heater housing from bulkhead (4 bolts), Fig. 15, pull away slightly and disconnect cables from blower motor. Withdraw heater assembly and remove from vehicle.

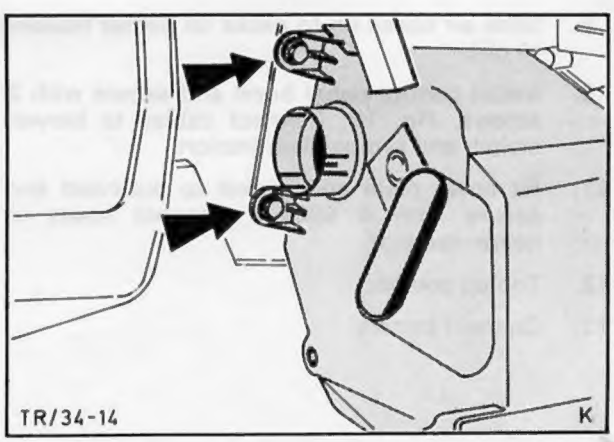

Fig. 15. Detach heater housing from bulkhead

34 354 (cont'd)

To Install

7. Install heater housing, connect cables to blower motor, Fig. 16, and secure housing to bulkhead with 4 bolts.

   NOTE: Position foam gasket on housing, Fig. 17.

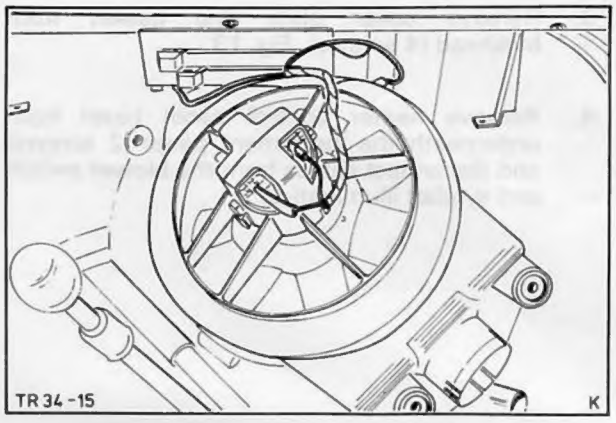

Fig. 16. Connect cables to blower motor

8. Connect bowden cables to air flap valve levers and adjust as follows: Position control levers approx. 2 mm before stop. Move appropriate flap valve to end position and clip bowden cable outer cover in this position on heater housing.

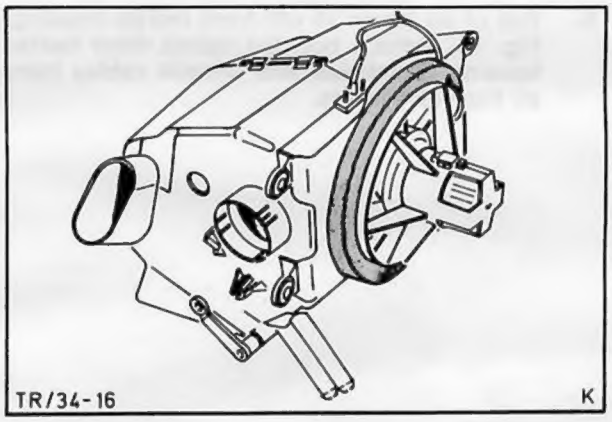

Fig. 17. Position foam gasket on housing

9. Slide air hoses on to necks on heater housing (4 off).
10. Install control panel bezel and secure with 2 screws, Fig. 18. Connect cables to blower switch and symbol illumination.
11. Fit cover plate and gasket to bulkhead and secure with 4 screws. Connect hoses to heater radiator.
12. Top up coolant.
13. Connect battery.

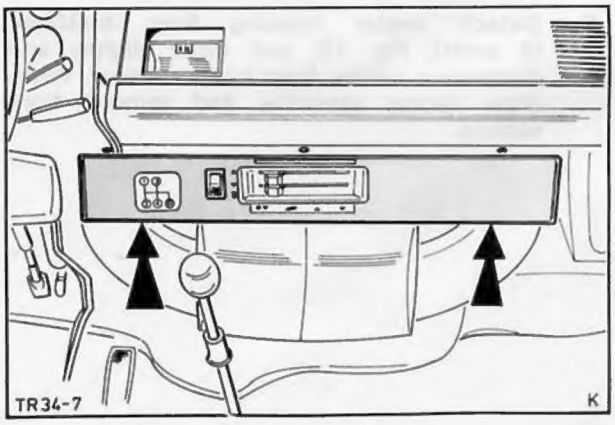

Fig. 18. Install control panel bezel

34 354 8 HEATER ASSEMBLY – DISMANTLE AND REASSEMBLE (Heater assembly removed)

To Dismantle

1. Remove foam gasket from blower flange, Fig. 19, and separate heater assembly halves (10 clips), Fig. 20.

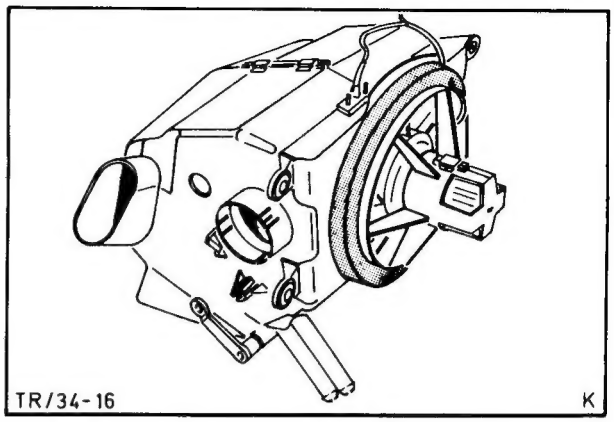

Fig. 19. Remove foam gasket from blower flange

2. Remove blower motor and air flap valves from housings, Fig. 21.

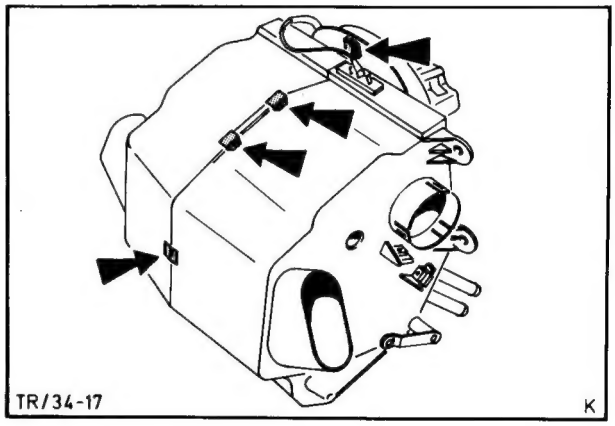

Fig. 20. Separate heater assembly halves

3. Remove heater radiator from housing.

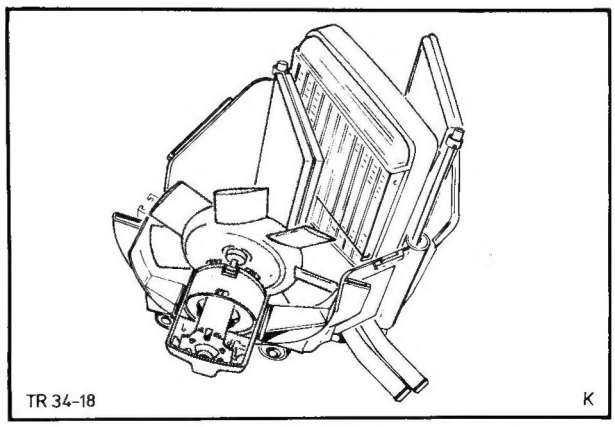

Fig. 21. Remove blower motor and air flap valves from housings

34 354 8 (cont'd)

To Reassemble

4. Install heater radiator in housing, renewing foam gasket if necessary, Figs. 22 and 23.

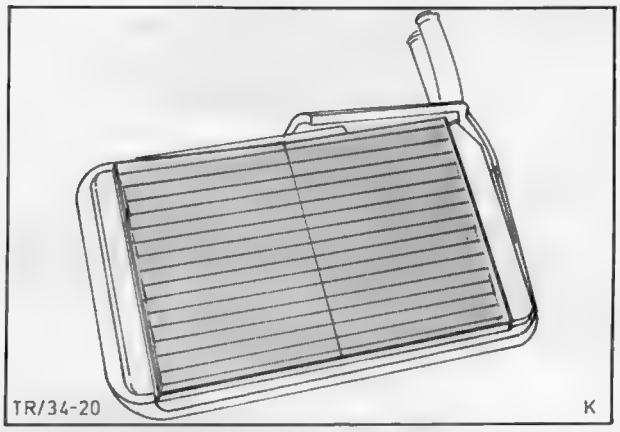

Fig. 22. Renew foam gasket, if necessary

5. Assemble air flap valves and blower motor to housings. Assemble housing halves and secure with 10 clips, Fig. 24.

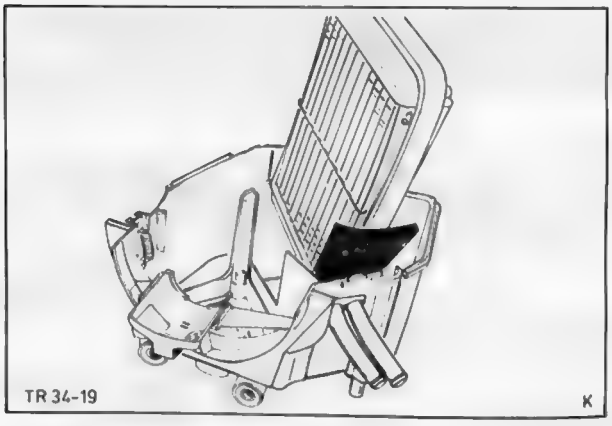

Fig. 23. Install heater radiator in housing

6. Position foam gasket around blower flange on heater housing.

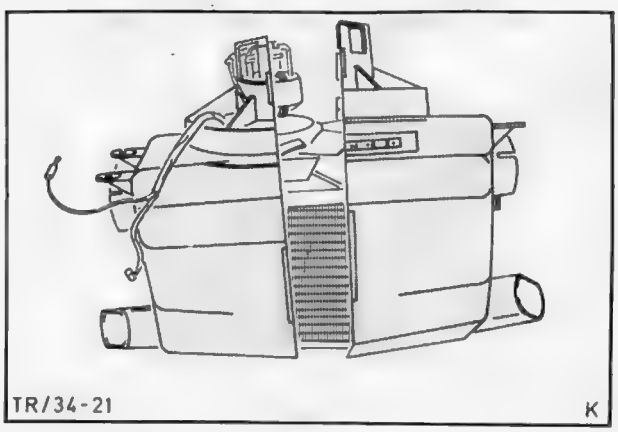

Fig. 24. Assemble housing halves

34 474 HOSE – DEMISTER REMOVE AND INSTALL

To Remove

1. Pull demister hose off heater housing and demister nozzle, Fig. 25.

To Install

2. First push demister hose over demister nozzle then on to neck on heater housing.

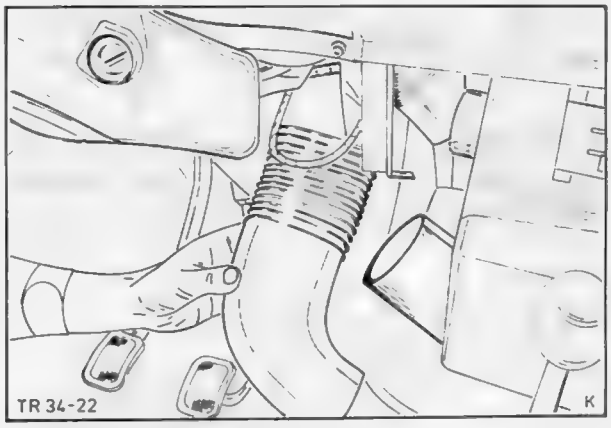

Fig. 25. Withdraw demister hose

34 483 DEMISTER – REMOVE AND INSTALL

To Remove

1. Remove demister nozzle (2 screws), Fig. 26, and withdraw complete with hose.

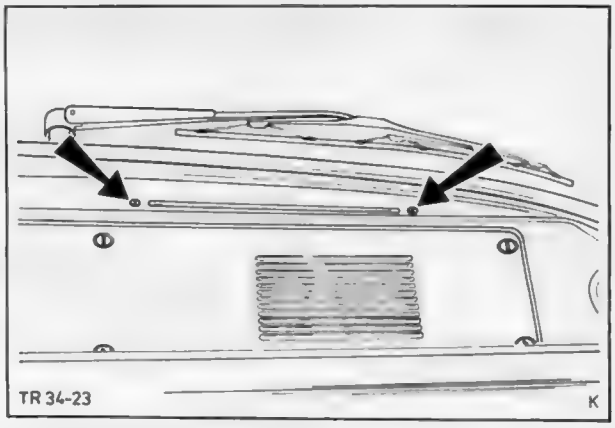

Fig. 26. Remove demister nozzle

2. Pull the demister nozzle off the hose, Fig. 27.

To Install

3. Push demister nozzle on to hose.
4. Install demister nozzle and hose assembly and secure with two screws.

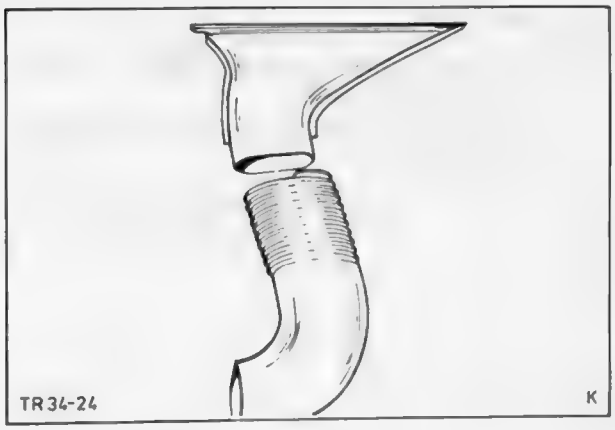

Fig. 27. Pull nozzle off hose

34 487 VENT – FACE LEVEL – REMOVE AND INSTALL

To Remove

1. Remove vent by unscrewing outer retaining ring, Fig. 28.

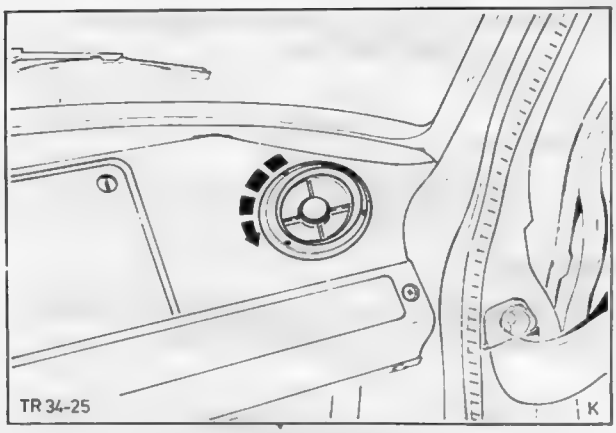

Fig. 28. Remove face level vent

2. Withdraw vent and hose from behind the fascia. Separate vent from hose, Fig. 29.

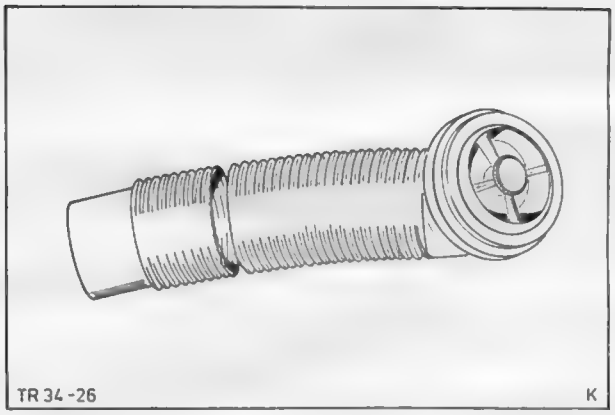

Fig. 29. Remove vent and hose assembly

To Install

3. Push vent on to hose and install assembly from behind the fascia.

   NOTE: Ensure vent locates in guide groove in fascia, Fig. 30.

4. Secure vent with outer retaining ring.

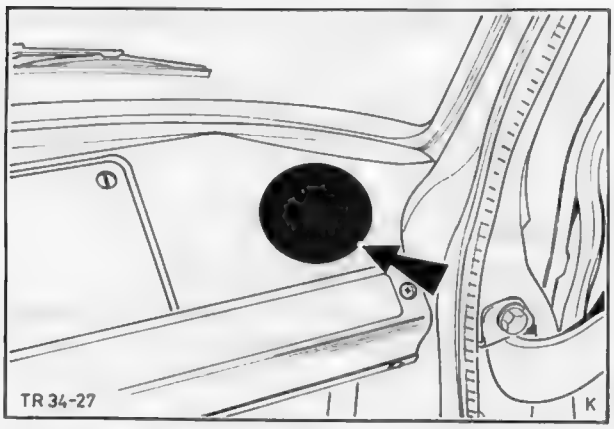

Fig. 30. Guide groove in fascia

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GENERAL DESCRIPTION

All TRANSIT variants built since August '82 (Build Code CP) are equipped with a new heating installation.

The 4-part heater casing accommodating the blower and the heater radiator is located inside the vehicle under the instrument panel. The heater is attached to the vent and demister nozzles by means of hoses.

The two-speed blower is operated by a rocker switch on the facia.

The temperature and distribution of the incoming air can be regulated by means of adjustable control levers. Depending on the setting of the air valves in the heater casing, warm or cold air flows into the interior or to the windows, Fig.1.

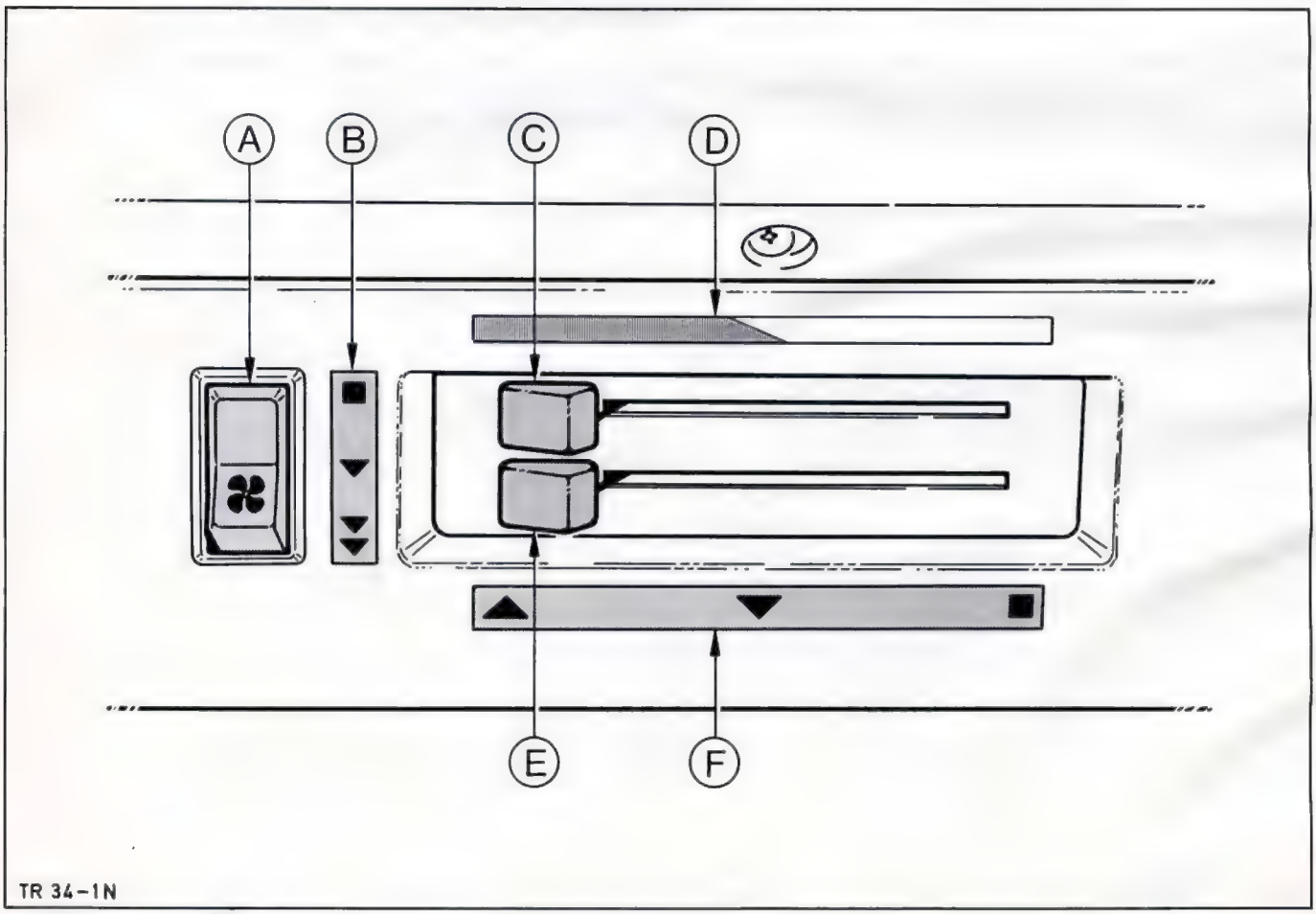


Fig.1. Heater blower controls.
A - Blower switch
B - Blower symbols
C - Temperature control lever
D - Temperature control symbol
E - Air distribution lever
F - Air distribution symbols

PRINCIPLE OF OPERATION

The air needed for the heater passes through the heater radiator in the heater casing. The heater radiator is of similar design to the radiator of the engine cooling system. Hot coolant flows through the heater radiator. The heat contained in the coolant is conducted through the radiator core, by means of cooling fins, to the stream of air flowing into the interior of the vehicle, i.e. heat exchange takes place between the coolant and the air (hence the name heater exchanger).

The temperature and distribution of the heating - or cooling - air are regulated by air valves in the heater casing. The upper - temperature control - lever, Fig.2, operates the temperature regulating valve by means of a Bowden cable to mix two streams of air. One of these comes straight from the outside (and is cold) while the other is directed through the heater radiator (and is warm). This allows adjustment of the temperature as required.

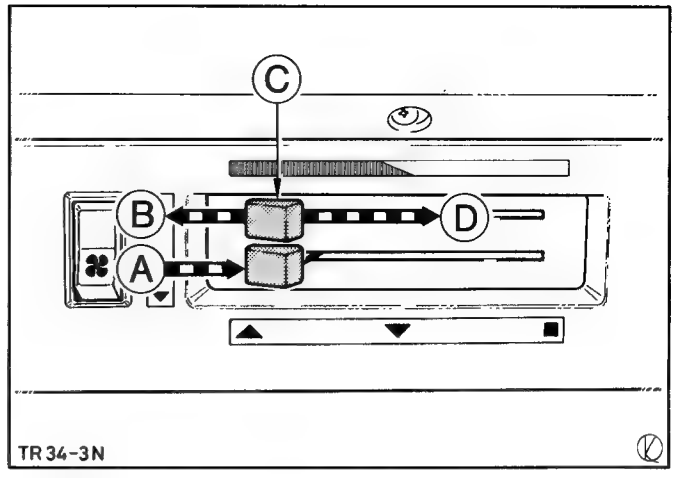


Fig.2. A - Air distribution lever
B - Warm
C - Temperature regulating lever
D - Cold

The lower - air distribution - lever, Fig.2, operates the air distribution valve by means of a Bowden cable to distribute the air to the footwells and the demister nozzles, depending on the lever setting. The heating system is designed so that warm or cold air can be directed to the vent nozzles, depending on the setting of the air distribution lever, Fig.5.

A two-speed electric blower is also provided in the heater casing so that an adequate flow of air can be achieved, even when moving slowly, Figs 3 and 4.

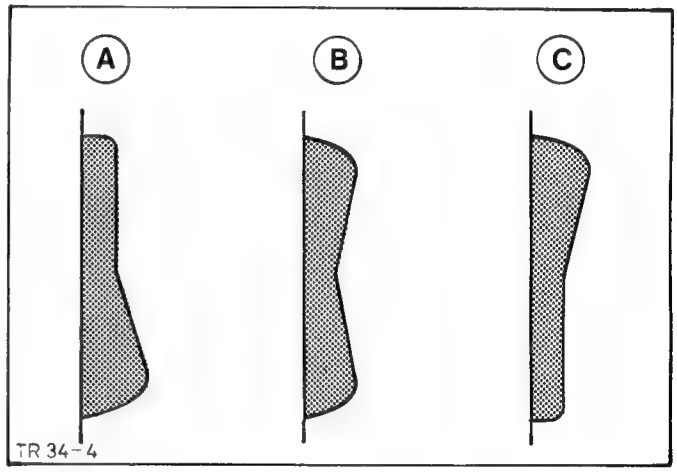


Fig.3. A - Blower off
B - Blower speed I
C - Blower speed II

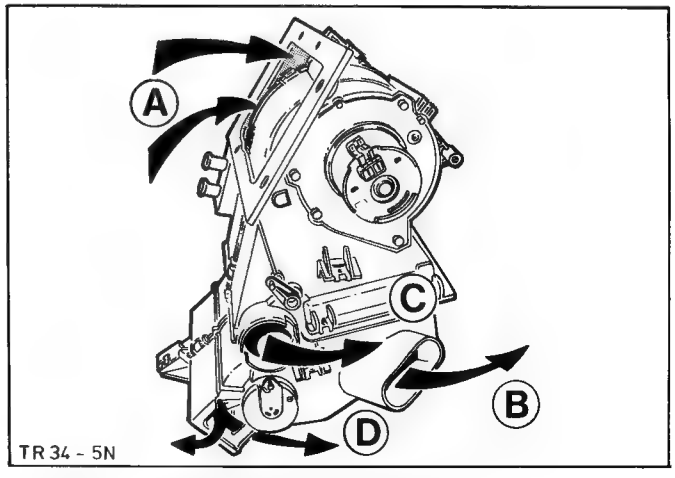


Fig.4. A - Supply of outside air
B - To the demister nozzles
C - To the vents nozzles
D - To the footwells

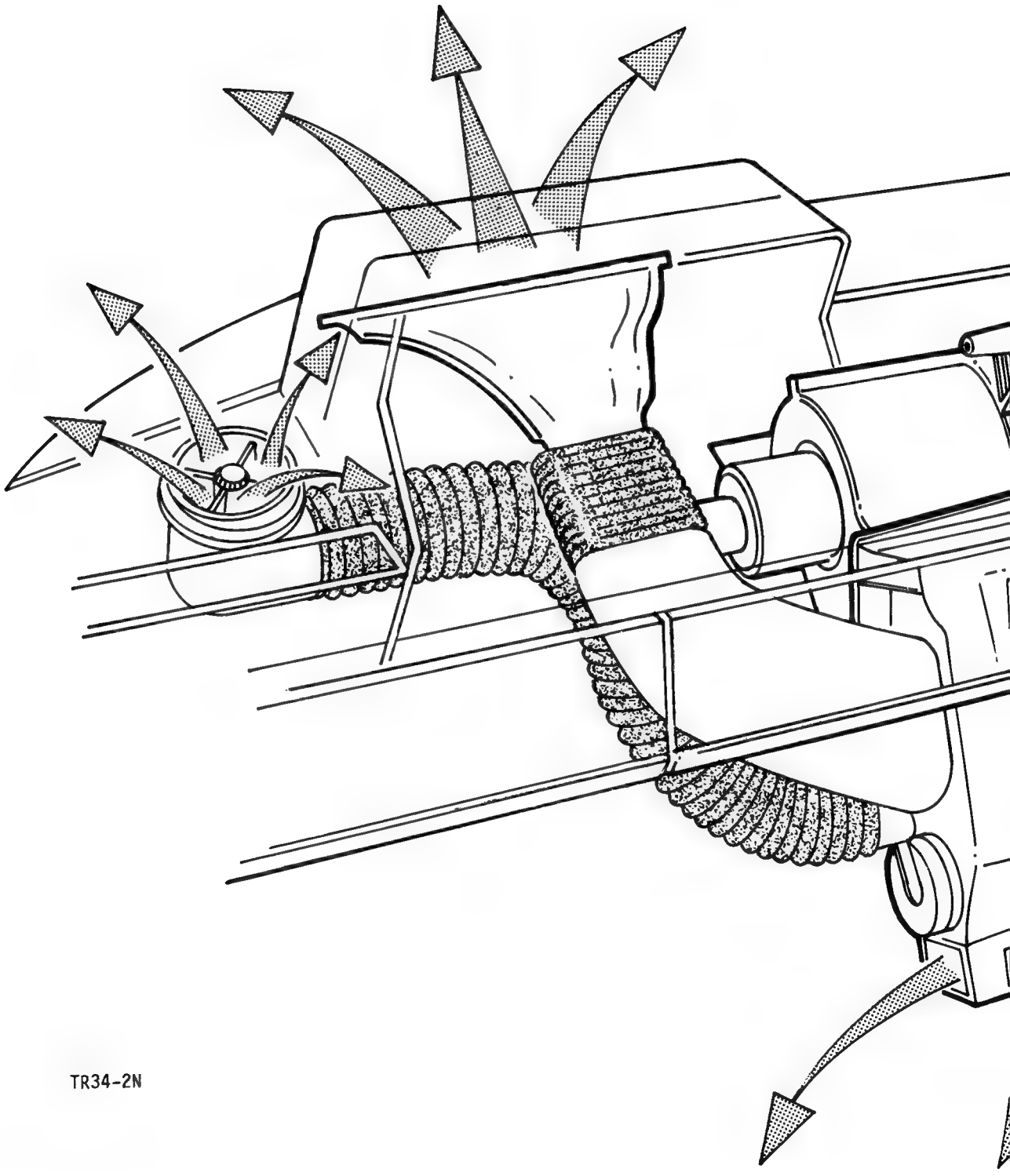
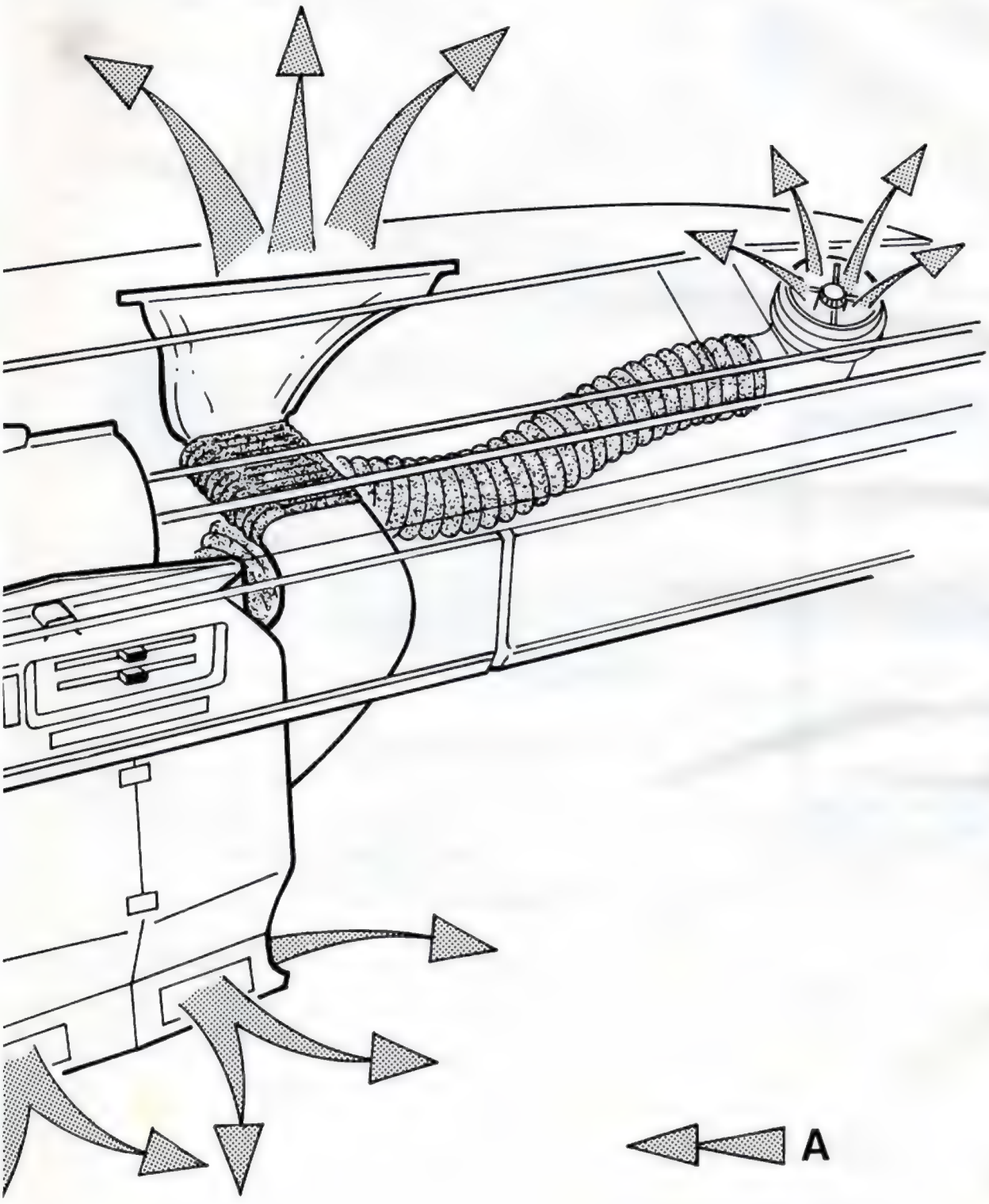


Fig.5. Diagrammatic view showing air distribution.
A - Cold/warm air depending on setting of air distribution lever.


A

SERVICE CHECKS AND ADJUSTMENTS

The efficiency of the heater and ventilation is also largely dependent on correct adjustment and fitting of the Bowden cables. Consequently, when attaching the Bowden cables to the heater casing, the two control levers must not be on their stops but approx 2 mm away from them, Fig.6.

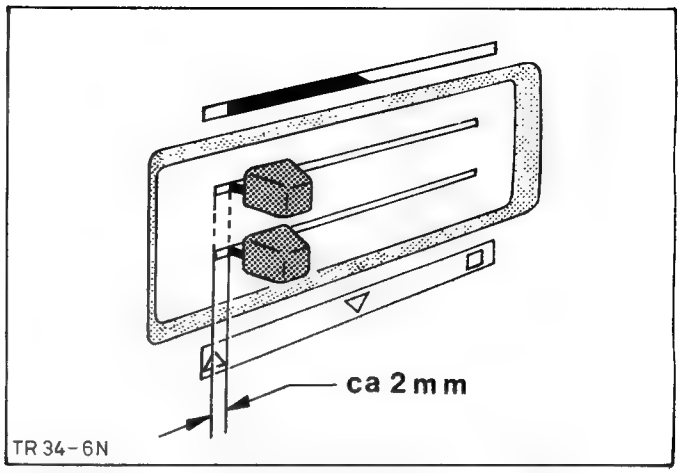


Fig.6. When fitting Bowden cable, control lever must be approx 2 mm before the stop.

SPECIAL SERVICE TOOL RECOGNITION

No special service tools are required:

SERVICE AND REPAIR OPERATIONS CONTENTS

Heating and Ventilation		Described	Contained in operation
34 313	Heater controls - Adjust	-	34 354
34 314	Heater controls - Remove and Install	-	34 354
34 354	Heater assembly - Remove and Install	X	
34 354 8	Heater asssembly - Dismantle and Reassemble (Heater Assembly Removed)	X	
34 364 4	Radiator - Heater - Remove and Install	X	
34 374	Motor - Heater - Remove and Install	X	
34 474	Hose - Demister - Remove and Install (left)	X	34 484
34 483	Nozzle - Demister - Remove and Install	X	
34 487	Vent - Face Level - Remove and Install	X	

SERVICE AND REPAIR OPERATIONS

34 354 HEATER ASSEMBLY - REMOVE AND INSTALL

SPECIAL SERVICE TOOLS REQUIRED: NONE

To Remove

1. Disconnect battery earth lead.

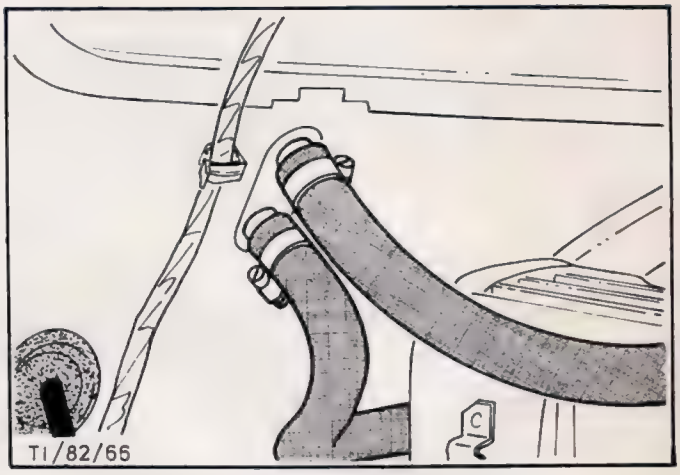


Fig.7. Detach hot water hose from heater radiator.

2. Position a tray under the vehicle to catch the coolant. Detach the hot water hoses from the heater radiator connector, Fig.7. Secure hoses in the engine compartment with their ends raised.

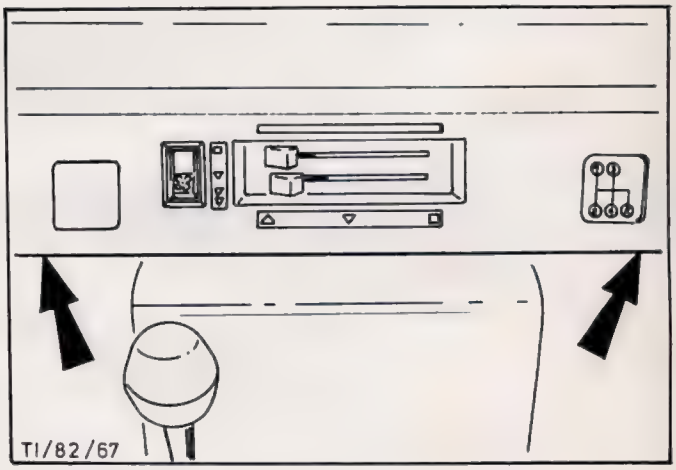


Fig.8. Detach bezel from the facia panel - retaining screws arrowed.

3. Detach bezel of heater control unit under the facia panel (2 crosshead screws), Fig.8.

   Pull out symbol illuminating bulb and holder. Pull multi-plug off the blower switch, Fig.9.

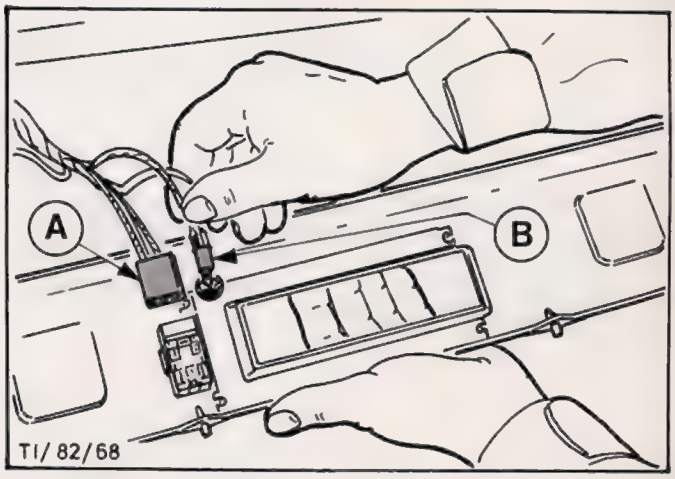


Fig.9. Pull off blower switch multi-plug, A, and detach symbol illuminating bulb and holder, B.

To Install

7. Locate the heater assembly in the vehicle, Fig.13. Connect plug of blower motor, Fig.14, and secure the heater casing to the bulkhead with 5 bolts.

NOTE: First locate the gasket over the heater radiator connector and glue a new foam gasket (when damaged) on the upper part of the heater casing.

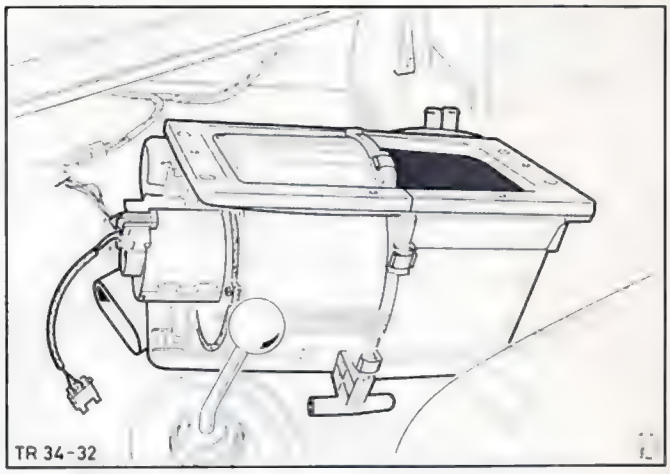


Fig.13. Locate heater assembly in vehicle.

8. Fit heater control unit complete with Bowden cables on the facia panel and secure with the 2 (TX40) Torx screws.

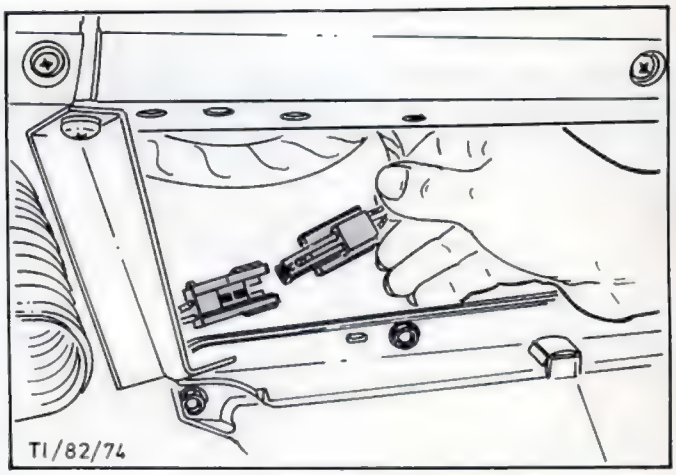


Fig.14. Attach plug to blower motor.

9. Attach and Bowden cables to the air valve levers and then adjust as follows: Position the control lever approx 2 mm before the stop, Fig.15, and secure the slotted retainer that holds the Bowden cable sheath so that the air valve in question is in its extreme position.

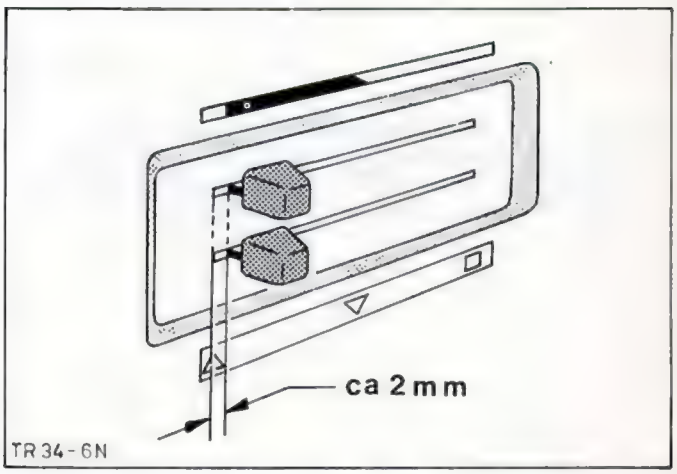


Fig.15. Position control lever approx 2 mm before the stop.

10. Attach the air hoses (4) of the demister and vent nozzles to the connectors on the heater casing, Fig.16.

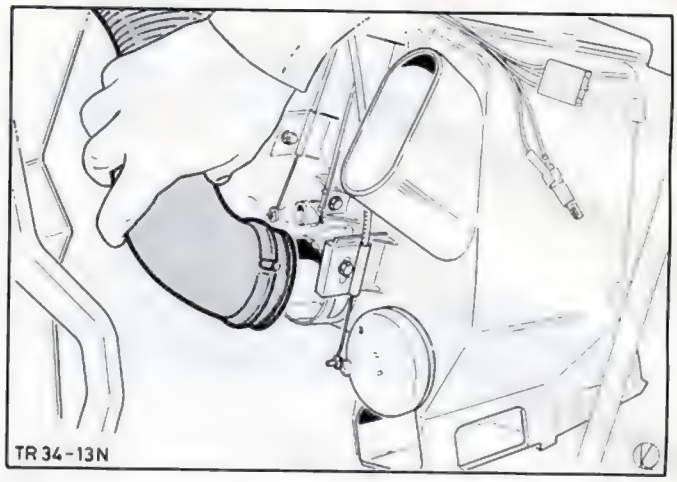


Fig.16. Attach air hoses to heater casing.

11. Fit blower switch multi-plug and symbol illuminating bulb and holder, Fig.17. Mount bezel of heater control unit, Fig.18.

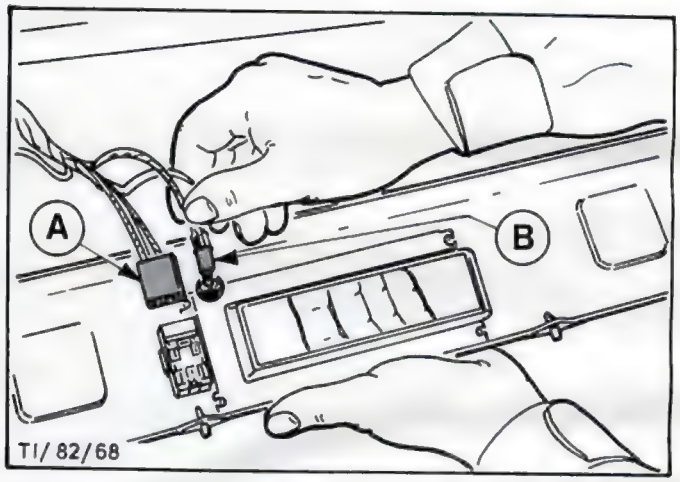


Fig.17. Fit multi-plug, A, and symbol light, B, to bezel of heater control unit.

12. Slide the hot water hoses onto the heater radiator connector and secure. Remove the collecting tray, refill the cooling system as specified and reconnect the battery.

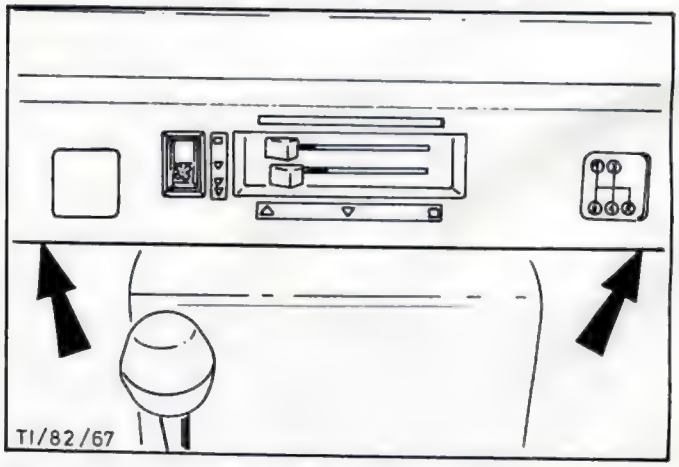


Fig.18. Mount bezel on facia panel - retaining screws arrowed.

34 354 8 HEATER ASSEMBLY - DISMANTLE AND REASSEMBLE (Heater Assembly Removed)

SPECIAL SERVICE TOOLS REQUIRED: NONE

To Dismantle

1. Separate the lower part of the casing from the upper part (8 screws), Fig.19.

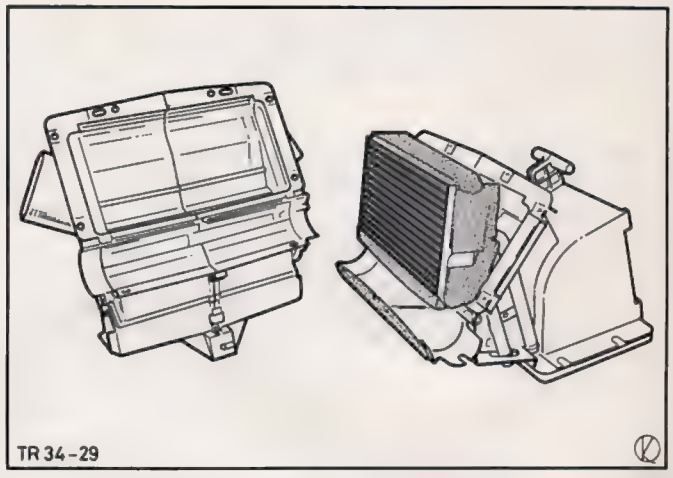


Fig.19. Separate casing halves (lower part from upper part).

2. Remove the electric motor from the heater casing (3 screws), Fig.20.

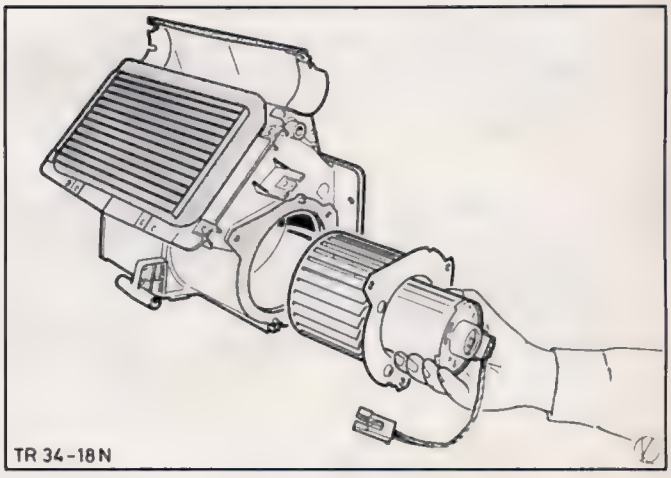


Fig.20. Withdraw electric motor from heater casing.

3. Withdraw the heater radiator from the casing, having first removed 1 screw from the bracket between the connectors.

4. Cut foam gasket of upper part of casing with a knife in the area of the casing halves, Fig.21. Remove the seven clips, separate upper part of casing and remove the air valve from the casing half in question.

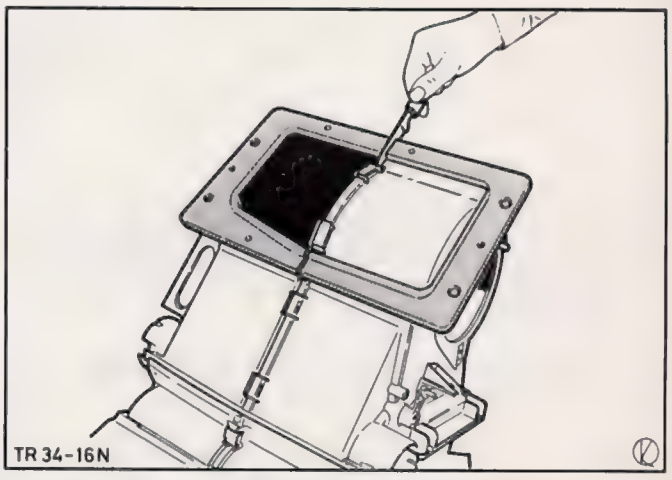


Fig.21. Cut foam gasket with a knife in area of casing halves.

5. Separate lower part of casing (6 clips) and remove the second air valve from the associated casing half, Fig.22.

NOTE: If possible, casing should not be separated unless heater was incorrectly assembled previously.

The bearings of the air valves cannot be replaced individually. If bearings or components are faulty or broken, the entire casing must be replaced.

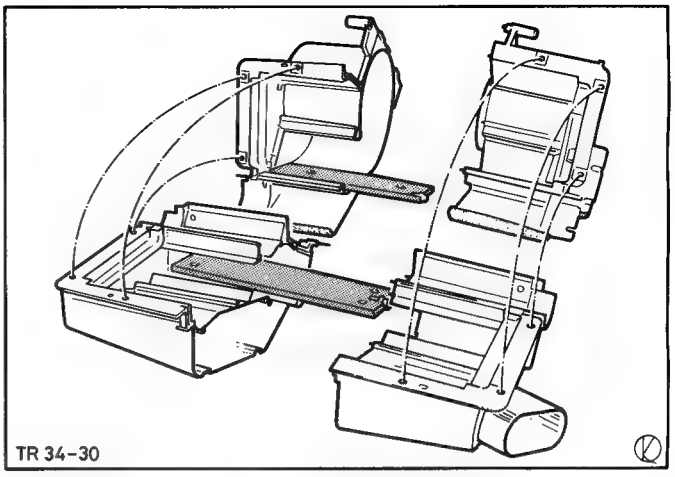


Fig.22. Assemble casing halves and air valves.

To Reassemble

6. Fit the plastic bearing to the air valves and insert these in the appropriate casing halves, bring the casing halves together and secure with clips.

NOTE: Install the air valve operating mechanisms in the heater casing before assembling the casing halves. To do this, align the broad toothing on the cog cover with the opening in the toothed segment (makes direct contact with the air valve) and then fit the cog cover, Fig.23.

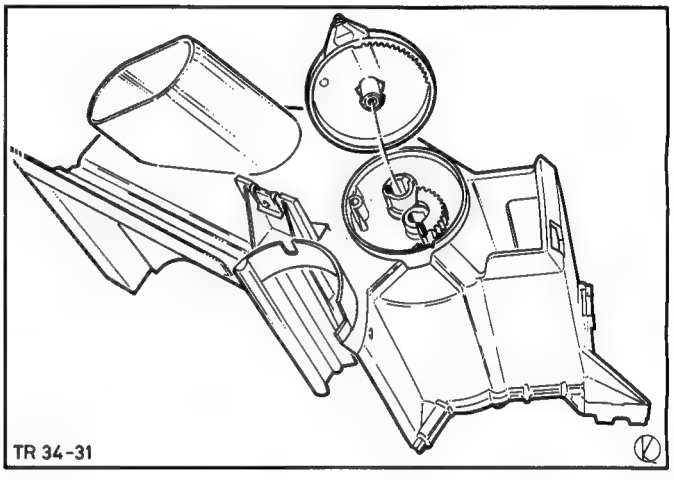


Fig.23. Assemble air valve operating mechanism.

7. Carefully insert the heater radiator in the heater casing, replacing the foam gasket if necessary, Fig.24, and secure it to the heater casing with a screw.

NOTE: The cooling fins on the heater radiator must not be damaged during this process.

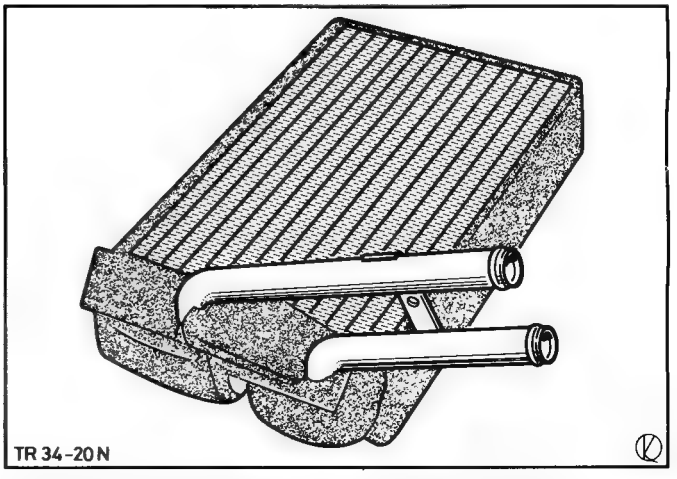


Fig.24. Heater radiator with foam gasket.

8. Screw the lower and upper parts of the casing together (8 screws), Fig.25.

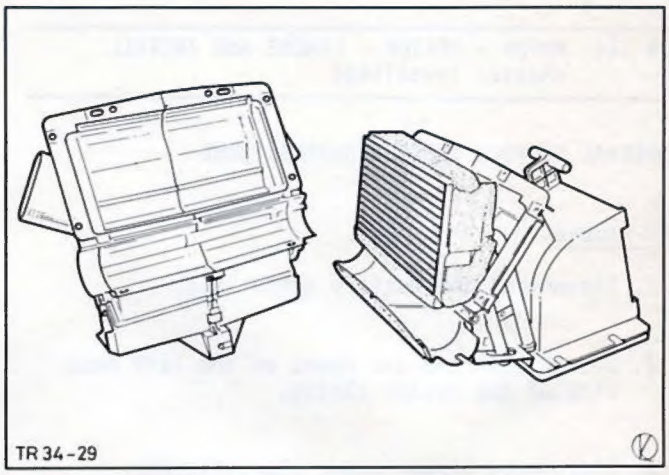


Fig.25. Screw casing lower and upper parts together.

9. Position gasket on heater casing, slide the electric motor with the fan into the casing and secure with three screws, Fig.26.

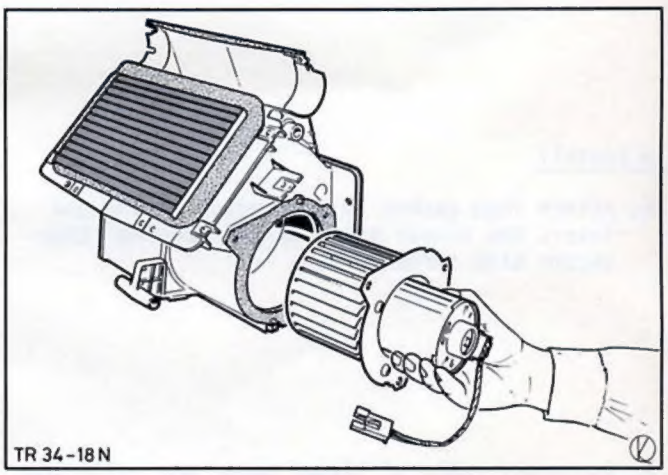


Fig.26. Insert the electric motor in the heater casing.

10. Stick a new foam gasket to the heater casing, Fig.27.

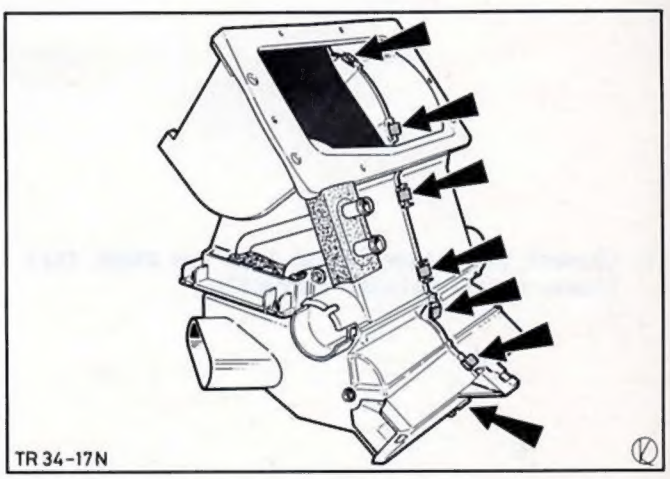


Fig.27. Heater fully assembled - foam gasket stuck in place. Retaining clips arrowed.

34 374 MOTOR - HEATER - REMOVE AND INSTALL (Heater Installed)

SPECIAL SERVICE TOOLS REQUIRED: NONE

To Remove

1. Disconnect the battery earth lead.
2. Detach both the air hoses on the left hand side of the heater casing.
3. Disconnect blower motor plug, Fig.28.
4. Undo the three retaining screws and withdraw the blower motor from the heater casing sideways, Figs. 29 and 30.

To Install

5. Attach foam gasket to the heater casing and insert the blower motor in the opening, then secure with three screws.
6. Reconnect cable of blower motor and refit the two air hoses.
7. Connect the battery earth lead and check that blower motor operates correctly.

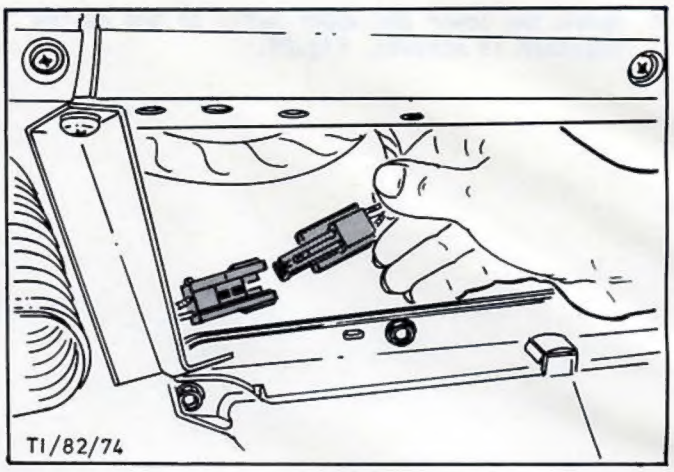


Fig.28. Disconnect blower motor plug (bezel of heater control unit removed for clarity).

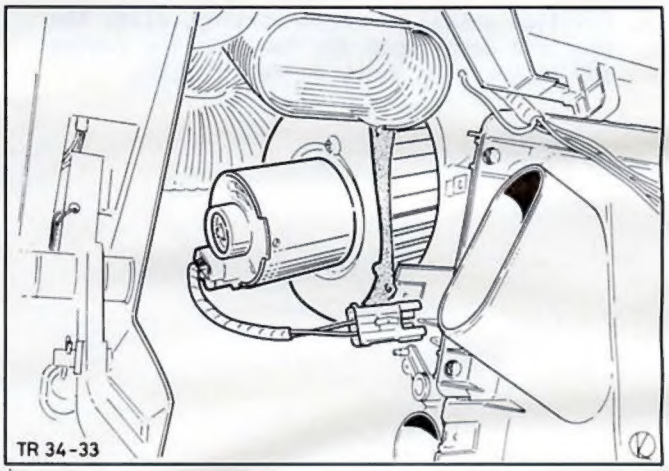


Fig.29. Draw heater blower motor out of the heater casing.

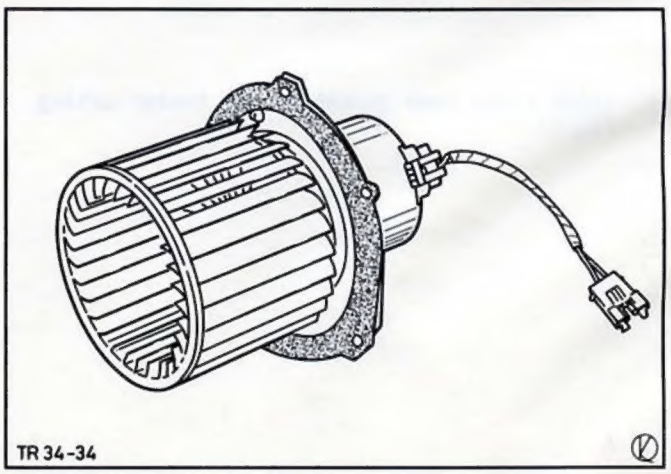


Fig.30. Blower motor removed - foam gasket shown shaded.

34 474 HOSE - DEMISTER - REMOVE AND INSTALL

SPECIAL SERVICE TOOLS REQUIRED: NONE

To Remove

1. Detach demister air hose from the heater casing and the demister nozzle and withdraw hose, Fig.31.

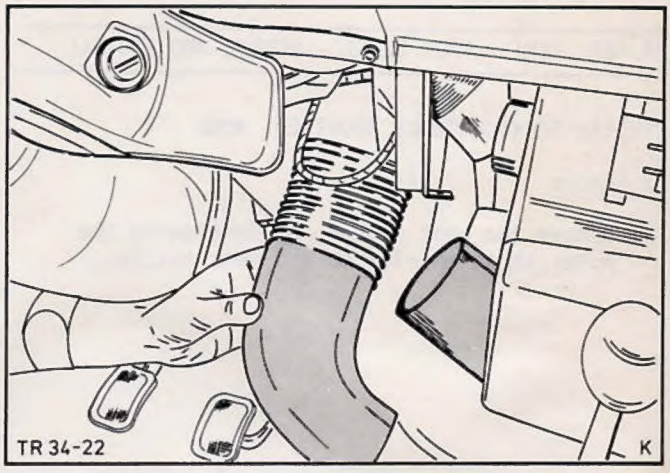


Fig.31. Detach demister hose.

To Install

2. Attach hose, first to demister nozzle and then to heater casing.

34 483 NOZZLE - DEMISTER - REMOVE AND INSTALL

SPECIAL SERVICE TOOLS REQUIRED: NONE

To Remove

1. Remove the two crosshead screws, Fig.32, and withdraw the nozzle complete with the hose.

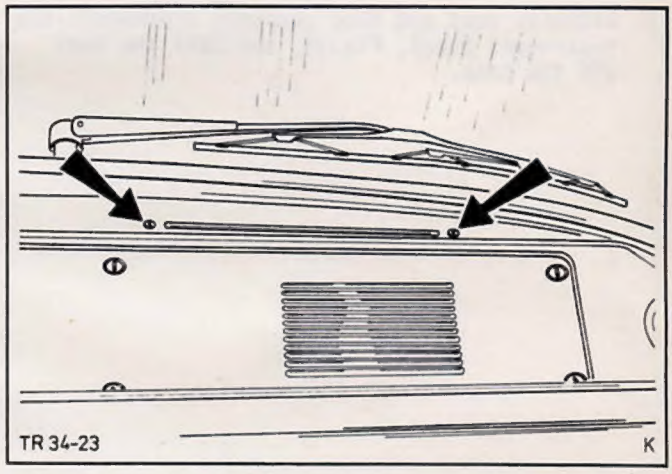


Fig.32. Remove demister nozzle.

2. Detach the demister nozzle from the hose, Fig.33.

To Install

3. Attach the nozzle to the hose.

4. Secure demister nozzle complete with the hose (2 screws).

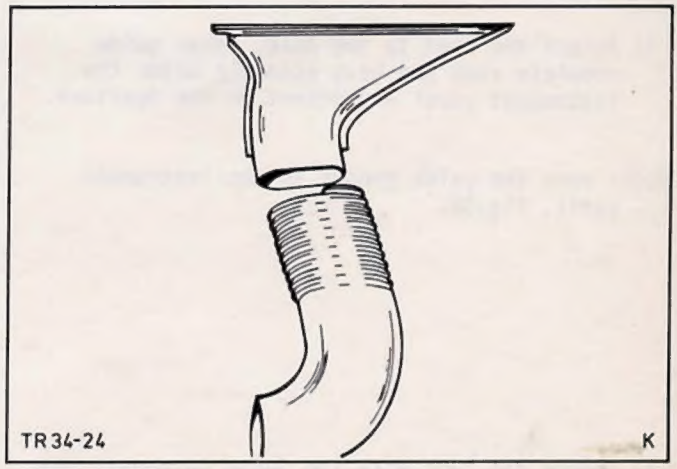


Fig.33. Detach nozzle from hose.

34 487 VENT - FACE LEVEL - REMOVE AND INSTALL

SPECIAL SERVICE TOOLS REQUIRED: NONE

To Remove

1. Remove the vent Fig.34, by unscrewing the outer threaded ring on the vent nozzle.

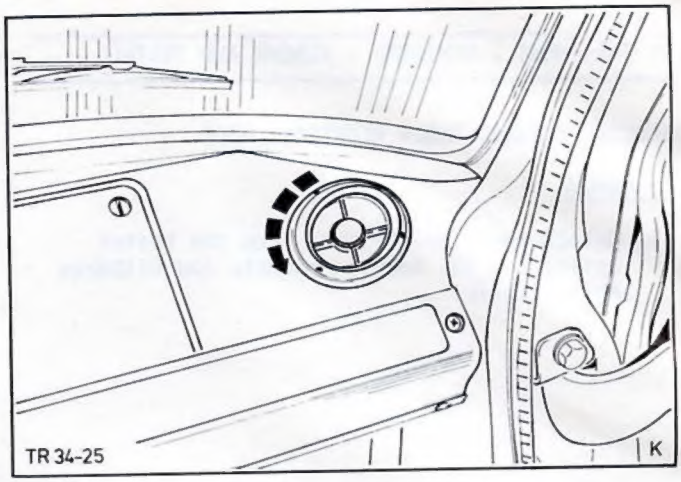


Fig.34. Remove vent.

2. Withdraw vent and hose complete underneath the instrument panel, Fig.35, and pull the vent off the hose.

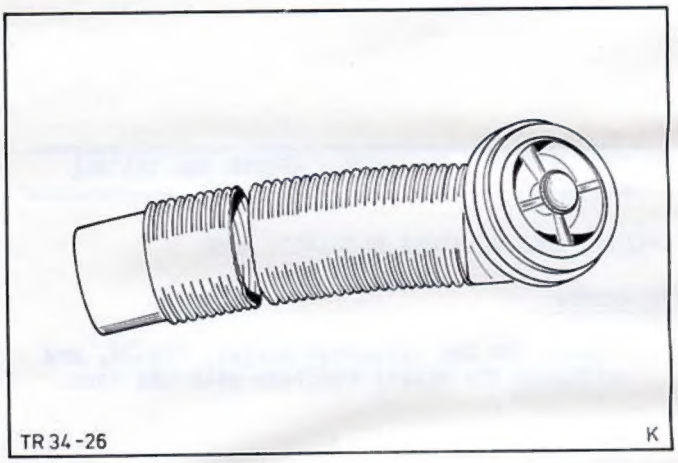


Fig.35. Withdraw vent and hose complete.

To Install

3. Attach the vent to the hose. Then guide complete vent and hose assembly under the instrument panel and insert in the aperture.

NOTE: Note the guide groove in the instrument panel, Fig.36.

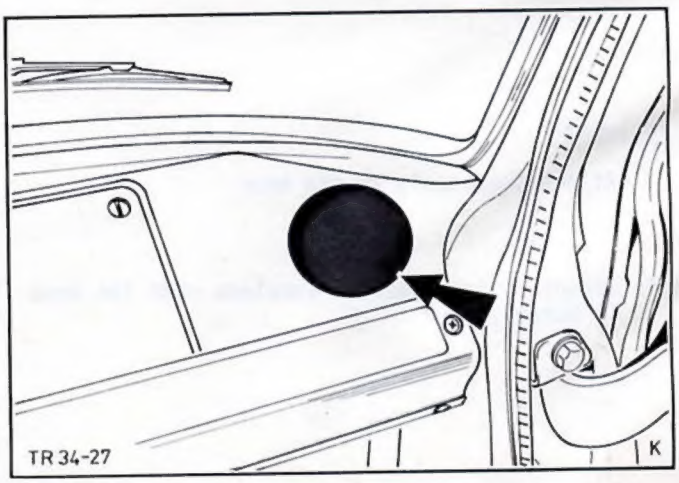


Fig.36. Guide groove in instrument panel.

4. Secure the vent with the outer threaded ring.